tion about local and global factors as well as the human-environment relationship. The results allowed us to recreate the background of the prehistoric settlement. The water-level changes of the palaeolake were strong limiting factors for the human settlement.

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PRELIMINARY RESULTS OF PALYNOLOGICAL INVESTIGATION OF BOTTOM SEDIMENTS FROM LAKE TURGOYAK (CHELUABINSK REGION, RUSSIA)

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Lake Turgoyak is a unique natural object. It is one of the largest water bodies of Chelyabinsk region. Turgoyak is a repository of pure natural water, the quality of water is close to such like in the Baikal Lake [1]. Water surface area of the lake is 26.4 km. The average depth of the lake is 19.1 m, the maximum depth is 36.5 m. Water transparency is 10-17.5 m. The climate of the lake basin is continental with a steady snow cover in cold winter and short summer with high rainfall in July [2]. As a natural monument Turgoyak has a particularly important environmental and recreational value. Due to bottom sediments that contain and store the information on ecological situations of the past the lake has important paleoclimatic value [3]. Biological paleoindicators such as diatoms, remains of vascular plants and invertebrates (cladocera, chironomidae, ostracoda), spores and pollen used for more accurate qualitative and quantitative reconstruction of past conditions [4]. The border location of the Urals, as the climate divide, makes paleoclimatic and paleoecological investigations of Lake Turgoyak especially important [5].

The article presents preliminary results of pollen analysis of the core of bottom sediments from Lake Turgoyak. In 2017, a 560 cm long sediment core was recovered from 5 m depth of the lake (55°09' N, 60°04' E). The core was retrieved with a modified Mackereth corer. A total 30 samples were taken at a 20-cm average intervals and were treated for pollen analysis using standard procedure [6]. Pollen residues were analyzed under a light microscope Axio Imager A2 (Carl Zeiss) with 400x magnification. Identification of pollen and spores was performed using pollen atlases [7-8]. The microscopic analysis revealed a high pollen concentration and generally good preservation, which allowed the identification of at least 300 terrestrial pollen grains per sample in upper part of the core (the first 21 samples). The lower part of the core did not contain a number of pollen grains sufficient for statistical processing. Percentages of taxa were calculated based on a pollen sum of all pollen taxa taken as 100%. The results are displayed in a diagram (Fig. 1) produced with Tilia/TiliaGraph and CONISS software [9]. The first 400 cm of precipitation was included in the diagram. The pollen diagram is subdivided in three pollen zones (PZs) based on changing pollen taxa composition and abundance. The pollen record is dominated by *Pinus sylvestris* and *Betula* throughout the core. *Picea*, *Artemisia* and *Chenopodiaceae* pollen grains are presents in all PZs.

The lower part of the PZI (370-290 cm) is characterized by the highest abundance of herbaceous pollen taxa (*Artemisia* up to 65 %, *Chenopodiaceae* up to 10 %) and low content of arboreal pollen taxa (10-30 %). Presumably this part of the PZI corresponds to the end of the Late Pleistocene. A sharp decline of the concentrations of non-arboreal pollen taxa and increase of *Betula* (up to 60 %) and *Pinus sylvestris* (20-40 %) pollen content is observed closer to the upper boundary of PZI. This event corresponds to warming preboreal period of the Holocene. According to radiocarbon data of the samples from a 350 cm depth coincides to 11770 ^{14}C Yr BP and development of arboreal taxa (*Betula, Pinus, Picea*).

PZII (290-70 cm) is characterized by the phase of development of dark coniferous forests with broad-leaved species. The content of *Betula* and *Pinus sylvestris* pollen is relatively high (35-55 %). The *Picea* pollen concentration changes slightly and remains low (up to 5 %). The broad-leaved species pollen occurs in this zone (*Alnaster*, *Tilia*, *Ulmus*) – up to 5 %. The content of *Artemisia* pollen reaches up to 10 %, Chenopodiaceae - up to 3 %. According to radiocarbon dates the samples from 250 cm depth coincides to 6625 ^{14}C Yr BP. It correlates with warming of the Atlantic period of the Holocene by the Blitt-Sernander scheme [10].

PZIII (70-0 cm) is characterized by an increase of *Picea* pollen (up to 10 %), *Artemisia* pollen (up to 15 %) and by a decrease of broad-leaved species pollen. Presumably the upper part of the core corresponds to the cooling of the Subboreal period of the Holocene.

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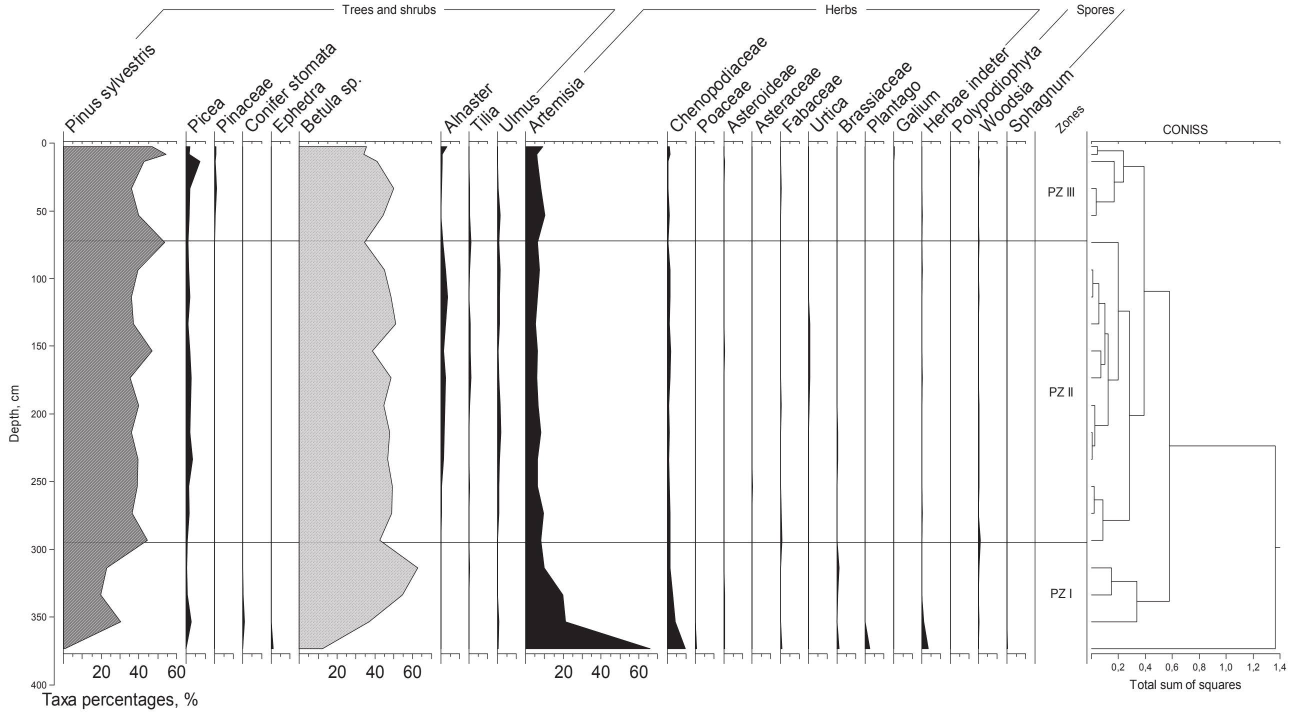

Fig. 1. Percentage pollen and spore diagram of the core of Lake Turgoyak

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PALEOLYMNOLOGICAL CHANGES IN THE LAKE-LEVELS ON THE TERRITORY OF BELARUS, LATVIA AND ESTONIA IN THE LATE GLACIAL AND THE HOLOCENE

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Analysis of the sedimentary cores of Belarus, Latvia and Estonia located within the meridional transect with a pronounced gradient of the natural conditions of the Late Glacial and Holocene allows us to trace and explain the synchronism/asynchrony of the changes in lake levels as an indicator of the transformation of climate, vegetation, landscapes, in a fairly large region of Europe – The Baltic Lakes District. As the reference objects of the study, Juusa in Estonia, the lake. Kuji in Latvia and the lake. Dolgoe in Belarus. The choice of these objects is due to a single glacial genesis and similar features of the lagging of lakes within various marginal stages of the Wurm ice retreat, as well as to a complex of paleogeographical studies of the history of the development of the water bodies themselves and the adjacent watersheds on the basis of lithologic-stratigraphic, paleofloristic, radiocarbon and isotope-geochemical diagnostic methods.

Based on the analysis of the conducted paleogeographical studies, the reconstruction of the level changes in the lakes of Estonia in Latvia and Belarus in the postglacial period was carried out, during which a number of general patterns (Fig. 1).

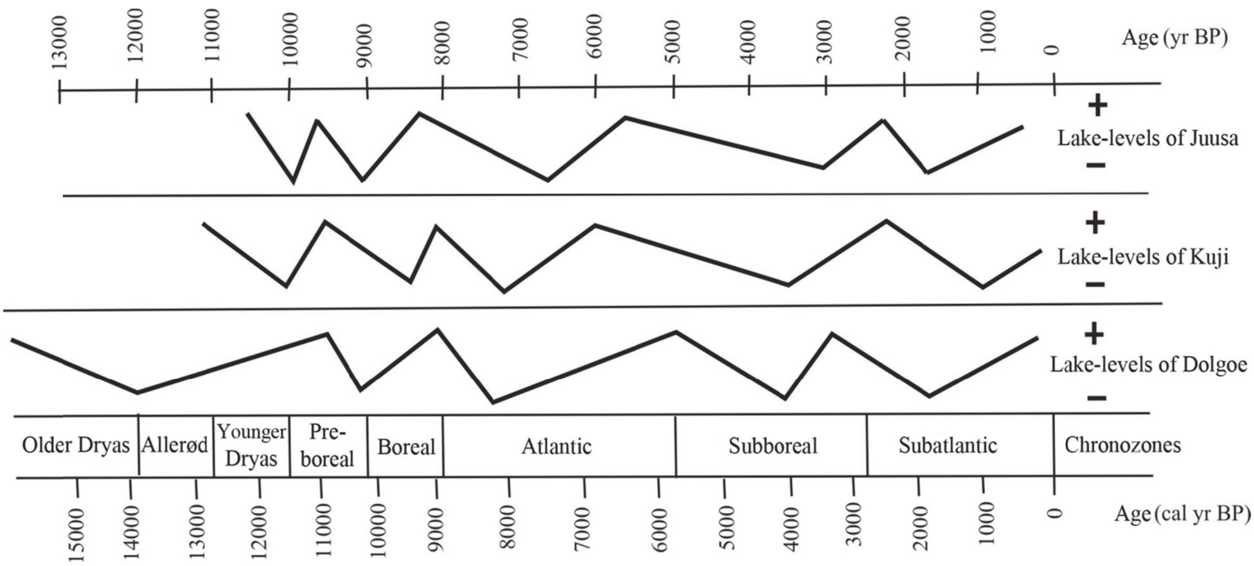

Fig. 1. The dynamics of changes in lake levels in the Baltic Lakes District in the postglacial period